

## Trichlorophenols

*Metabolites of organochlorine pesticides*

### General Information

The chemicals 2,4,5-trichlorophenol (245TCP, CAS No. 95-95-4) and 2,4,6-trichlorophenol (246TCP, CAS No. 88-06-2) are metabolites of several organochlorine chemicals, including HCH, HCB, and pentachlorophenol. Trichlorophenols are no longer intentionally manufactured, but they may be produced as byproducts of the manufacture of other chlorinated aromatic compounds. Small amounts of trichlorophenols can be produced during combustion of natural materials and

from the chlorination of wastewater that contains phenols.

### Interpreting Urine Trichlorophenol Levels Reported in the Tables

Trichlorophenols are excreted in human urine as unchanged trichlorophenols and as trichlorophenols conjugated to glucuronic acid and sulfate. Measurements provided in this *Report* include both free and conjugated forms of trichlorophenols. Generally recognized guidelines for urine levels of 245TCP and 246TCP have not been established. The levels for these chemicals are higher than levels measured previously in a non-random subsample from NHANES III during 1988-1994 (Hill et

**Table 166. 2,4,5-Trichlorophenol**

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 1999-2000.

	Geometric mean (95% conf. interval)	Selected percentiles (95% confidence interval)						Sample size
		10th	25th	50th	75th	90th	95th	
<b>Total, age 6 and older</b>	*	< LOD	< LOD	< LOD	1.40 (1.00-2.40)	5.40 (2.50-15.0)	16.0 (4.30-39.0)	1998
<b>Age group</b>								
6-11 years	*	< LOD	< LOD	< LOD	1.30 (1.20-2.00)	4.60 (2.30-11.0)	11.0 (5.30-23.0)	483
12-19 years	*	< LOD	< LOD	< LOD	1.60 (1.00-3.10)	5.40 (2.80-22.0)	24.0 (4.70-40.0)	682
20 years and older	*	< LOD	< LOD	< LOD	1.40 (.970-2.50)	5.30 (2.20-18.0)	18.0 (4.20-46.0)	833
<b>Gender</b>								
Males	*	< LOD	< LOD	< LOD	1.40 (1.00-2.60)	5.30 (2.50-8.60)	9.30 (5.20-28.0)	974
Females	*	< LOD	< LOD	< LOD	1.50 (1.00-3.00)	6.50 (2.20-27.0)	21.0 (3.20-48.0)	1024
<b>Race/ethnicity</b>								
Mexican Americans	*	< LOD	< LOD	< LOD	1.70 (1.40-3.50)	8.50 (4.70-18.0)	21.0 (12.0-29.0)	697
Non-Hispanic blacks	*	< LOD	< LOD	< LOD	1.20 (.940-1.90)	4.80 (2.20-7.70)	8.60 (4.20-63.0)	524
Non-Hispanic whites	*	< LOD	< LOD	< LOD	1.40 (.960-3.20)	4.50 (2.40-7.50)	9.20 (4.40-25.0)	602

< LOD means less than the limit of detection, which is 0.9 µg/L.

\* Not calculated. Proportion of results below limit of detection was too high to provide a valid result.

al., 1995). The 245TCP levels at the 90<sup>th</sup> and 95<sup>th</sup> percentiles for adults in this *Report* are threefold to sixfold higher than their respective percentile levels in a non-random subsample from NHANES III. Similarly, the 246TCP level at the 95<sup>th</sup> percentile for adults is about sixfold higher than in NHANES III. Levels in this *Report* are also higher than levels reported in municipal incineration workers, control subjects, a general population in Germany (Angerer et al., 1992), and also in a control group of children (Hill et al., 1989).

Geometric mean levels of the demographic groups were compared after adjustment for the covariates of race/ethnicity, age, gender, and urinary creatinine.

Urinary 246TCP levels were higher in the group aged 6-11 years than the groups aged 12-19 years or 20 years and older. Levels in the group aged 12-19 years were higher than levels in the group aged 20 years and older. There were no differences in 246TCP levels for gender or race/ethnicity. It is unknown whether differences between ages or races/ethnicities represent differences in exposure, body-size relationships, or metabolism.

**Table 167. 2,4,5-Trichlorophenol (creatinine adjusted)**

Geometric mean and selected percentiles of urine concentrations (in µg/gram of creatinine) for the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 1999-2000.

	Geometric mean (95% conf. interval)	Selected percentiles (95% confidence interval)						Sample size
		10th	25th	50th	75th	90th	95th	
<b>Total, age 6 and older</b>	*	< LOD	< LOD	< LOD	2.36 (1.60-3.05)	5.50 (3.16-11.9)	11.9 (4.78-20.0)	1998
<b>Age group</b>								
6-11 years	*	< LOD	< LOD	< LOD	2.27 (1.54-3.93)	5.79 (4.03-11.9)	12.8 (5.28-25.4)	483
12-19 years	*	< LOD	< LOD	< LOD	1.44 (1.03-2.19)	3.77 (2.19-10.8)	11.2 (2.71-17.6)	682
20 years and older	*	< LOD	< LOD	< LOD	2.46 (1.64-3.15)	5.71 (3.16-12.7)	11.7 (4.31-20.0)	833
<b>Gender</b>								
Males	*	< LOD	< LOD	< LOD	1.67 (1.08-2.92)	4.24 (3.01-9.55)	9.55 (3.91-16.0)	974
Females	*	< LOD	< LOD	< LOD	2.57 (1.80-4.00)	7.73 (3.01-17.8)	16.2 (4.85-30.2)	1024
<b>Race/ethnicity</b>								
Mexican Americans	*	< LOD	< LOD	< LOD	2.49 (1.79-3.90)	6.89 (4.35-11.7)	11.8 (6.90-16.9)	697
Non-Hispanic blacks	*	< LOD	< LOD	< LOD	1.16 (.831-1.92)	3.39 (2.31-6.08)	6.79 (2.95-18.2)	524
Non-Hispanic whites	*	< LOD	< LOD	< LOD	2.44 (1.60-3.15)	4.72 (3.20-9.55)	9.55 (4.08-19.6)	602

< LOD means less than the limit of detection (see previous table).

\* Not calculated. Proportion of results below limit of detection was too high to provide a valid result.

**Table 168. 2,4,6-Trichlorophenol**

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 1999-2000.

	Geometric mean (95% conf. interval)	Selected percentiles (95% confidence interval)						Sample size
		10th	25th	50th	75th	90th	95th	
<b>Total, age 6 and older</b>	2.85 (2.58-3.15)	< LOD	1.20 (<LOD-1.20)	2.45 (2.30-2.70)	4.80 (4.00-6.62)	14.8 (8.80-21.0)	25.0 (17.0-37.0)	1989
<b>Age group</b>								
6-11 years	4.47 (3.53-5.66)	< LOD	2.00 (1.20-2.40)	3.72 (2.80-5.20)	11.0 (5.10-18.0)	24.0 (15.0-35.9)	32.0 (25.0-45.0)	481
12-19 years	3.56 (3.06-4.14)	< LOD	1.50 (1.20-2.20)	3.00 (2.70-3.40)	6.00 (4.70-9.10)	20.0 (11.0-32.0)	37.0 (24.0-47.0)	678
20 years and older	2.52 (2.25-2.83)	< LOD	1.20 (<LOD-1.20)	2.40 (2.00-2.50)	4.20 (3.50-5.00)	11.6 (7.59-18.0)	21.0 (13.0-32.0)	830
<b>Gender</b>								
Males	2.92 (2.56-3.33)	< LOD	1.10 (<LOD-1.20)	2.60 (2.30-2.90)	5.10 (3.90-7.79)	15.0 (8.90-21.0)	26.0 (15.0-37.0)	970
Females	2.78 (2.40-3.22)	< LOD	1.20 (<LOD-1.20)	2.40 (2.00-2.60)	4.80 (3.80-6.40)	16.0 (7.50-23.0)	25.0 (16.0-45.0)	1019
<b>Race/ethnicity</b>								
Mexican Americans	2.70 (2.20-3.33)	< LOD	< LOD	2.60 (2.10-3.10)	4.80 (4.10-6.80)	14.0 (8.00-23.0)	22.0 (15.0-32.0)	694
Non-Hispanic blacks	3.14 (2.47-3.99)	< LOD	1.20 (<LOD-1.70)	2.80 (2.20-3.40)	6.40 (3.80-11.0)	18.0 (11.0-31.0)	32.0 (19.0-49.0)	519
Non-Hispanic whites	2.74 (2.48-3.04)	< LOD	1.20 (<LOD-1.30)	2.45 (2.30-2.80)	4.60 (3.90-6.00)	13.0 (7.70-19.0)	20.0 (13.0-36.0)	601

< LOD means less than the limit of detection, which is 1.0 µg/L.

**Table 169. 2,4,6-Trichlorophenol (creatinine adjusted)**

Geometric mean and selected percentiles of urine concentrations (in µg/gram of creatinine) for the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 1999-2000.

	Geometric mean (95% conf. interval)	Selected percentiles (95% confidence interval)						Sample size
		10th	25th	50th	75th	90th	95th	
<b>Total, age 6 and older</b>	2.54 (2.28-2.84)	< LOD	1.17 (.950-1.44)	2.38 (2.12-2.73)	4.91 (3.93-6.09)	12.1 (9.41-16.8)	21.2 (14.9-28.5)	1989
<b>Age group</b>								
6-11 years	4.82 (3.91-5.95)	< LOD	2.22 (1.64-2.93)	4.71 (3.40-6.67)	11.5 (7.59-15.3)	21.8 (15.3-31.1)	31.5 (24.7-33.8)	481
12-19 years	2.40 (2.04-2.83)	< LOD	1.22 (.800-1.57)	2.33 (1.98-2.64)	4.27 (3.38-5.54)	11.6 (7.67-13.5)	14.4 (12.1-20.6)	678
20 years and older	2.32 (2.04-2.63)	< LOD	1.04 (.852-1.31)	2.22 (1.89-2.57)	4.25 (3.51-5.44)	9.95 (7.07-14.5)	19.6 (12.4-28.6)	830
<b>Gender</b>								
Males	2.24 (1.92-2.61)	< LOD	.968 (.750-1.30)	2.15 (1.82-2.43)	4.41 (3.64-5.59)	10.8 (7.22-15.3)	17.5 (11.2-28.5)	970
Females	2.88 (2.50-3.32)	< LOD	1.33 (1.05-1.66)	2.63 (2.23-2.96)	5.53 (4.27-6.90)	13.3 (10.1-20.6)	24.7 (16.9-34.4)	1019
<b>Race/ethnicity</b>								
Mexican Americans	2.43 (2.03-2.90)	< LOD	< LOD	2.50 (2.22-2.83)	5.43 (4.04-7.04)	10.8 (8.63-14.7)	18.3 (12.5-21.3)	694
Non-Hispanic blacks	2.13 (1.72-2.65)	< LOD	.899 (.696-1.27)	1.90 (1.58-2.56)	3.97 (3.01-6.47)	11.6 (5.54-19.5)	19.4 (12.7-25.2)	519
Non-Hispanic whites	2.59 (2.27-2.95)	< LOD	1.24 (1.02-1.57)	2.41 (2.11-2.93)	4.87 (3.83-5.88)	11.2 (7.62-16.9)	19.6 (13.2-31.5)	601

< LOD means less than the limit of detection (see previous table).